



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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TO: Internal File

FROM: Sharon Falvey, Project Team Lead *SXF*

RE: Wild Horse Ridge Significant Revision, Co-Op Mining Company, Bear Canyon Mine, ACT/015/025-SR99(1)
SR981

SUMMARY:

CW Mining proposes to add leases, east of the Bear Canyon Fault, to its existing permit area. The proposal includes new surface facilities in the Bear Canyon Right Fork.

In general, inconsistencies make the application inaccurate and unclear. Information related to operational and reclamation construction sequences and sediment control along the drainage need more description. The permit application should be corrected prior to approval.

TECHNICAL ANALYSIS:

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.18; R645-301-724.

Analysis:

The Mayo and Associates PHC, August 1999 incorporates current climatic information into the plan. Average annual precipitations are recorded between 10 and 15 inches from lower elevation gauging stations within the permit and adjacent area. Average annual precipitation is recorded as 29 and 33 inches in the high elevation gauging stations. The Palmer Hydrologic Drought Index for Utah Division 4 and Division 5 climatic regions are presented and discussed.

Findings:

The application meets the minimum requirements for this section.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and analysis

Holding time and sample analysis problems occurred at sites 16-7-13-1, 16-18-14 and 16-8-20-1. See Tables 2b and 3 in this TA. For surface water site WHR-1, fluoride was not distilled for baseline data on June and August 1993; however, fluoride is no longer considered a required baseline parameter. Holding time expired on Sulfate on 10/93. For all samples dissolved metals, which were filtered at lab, were received within one day. Lab sheets for all sites where data was collected on July 1991 were missing from the amendment and need to be submitted.

Baseline information

Table 7M-4 lists the proposed baseline monitoring points and baseline sampling will be implemented one year prior to the start of mining for new Federal Lease Areas. Text describing the sampling period for site WHR-1 does not match information presented in appendix 7M-A. Although included, adjacent area sampling associated with the Mc Cadden Hollow area were not reviewed. This information was not considered to be directly related to the proposed Wild Horse permit area, but will be considered applicable to the Cumulative Impact Area (CIA) information.

Ground-water information

Numerous sources for ground water related information is found throughout the plan. The baseline information relative to groundwater, seeps, and springs in the proposed Wild Horse Ridge permit are presented in Tables 1, 2 and, 2b in this TA. Data for groundwater well information, identified in Table 1, were collected in 1996 and 1997.

Table-1: Wild Horse Ridge Monitoring Wells*

Well Number	Formation Monitored & Relative Location	Screen Intervals	General Observations
MW-114	Spring Canyon Sandstone - East of the Bear Canyon Fault.	Upper screen interval 1795-1805 ft. Lower screen interval 1819-1829 ft.	Water elevation measured on 8/22/96, 09-24-96 and 10-23-97 varied from 7649.5 to 7650.5 feet. Potentiometric water level - approximately 26 ft below Hiawatha Seam.
MW-116	Spring Canyon - East of the Bear Canyon Fault	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1753.3 ft.	Water elevation measured on 10/18/95, 7/19/96, 09/24/96 and 10/23/97 varied from 7743.9 to 7744.5 feet. Potentiometric water level - approximately 71.2 ft below Hiawatha Seam.
MW-117	Spring Canyon - near fault line - East of the Bear Canyon Fault Section 12, T. 16 S. R. 7 E.	Upper screen interval 1720-1730 ft. Lower screen interval 1743.3-1759.7 ft.	At 1720 ft. fault gouge and fractured material encountered. Caving continued with out a defined Star Point Formation. Water elevation measured on 10/18/95, 07/19/96, 9/24/96 and 10/23/97 varied from 7746.2 to 7746.5 feet. Hiawatha Seam not identified on log.

*Data obtained from Cyprus-Mohrland Project Drill Report.

The wells should also be tested for chemical make-up and age dating to determine whether the ground water relationships are similar to those found west of the Bear Canyon fault.

The Wells MW-114, 116 and 117 should all be monitored for water level prior to mining the Wild Horse Ridge to verify the existing water elevations recorded at these wells are the same as the elevations obtained during 1996 and 1997. That way, should mining in the Wild Horse Ridge intercept water from a sand channel or other significant in mine flow, the pre-mining status at these wells will not be in question. Water dating and stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation east of the Fault.

Plates 6-2 through 6-12 also show locations for WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8. These five drill-holes fall within the adjacent area and the Cumulative Impact Area (CIA). The notation for springs and drill logs may be easily confused.

Spring Data

Spring sampling was conducted for the Wild Horse Ridge lease addition and adjacent

area as summarized in Table 2 below. Information on springs within and adjacent to the Wild Horse Ridge area include springs WHR-2, WHR-3 and WHR-4. Spring WHR-4A was included in the Probable Hydrologic Consequence document and on a map, but there was no flow recorded for that location (Figure 1, Mayo and Associate Report, August 1999). Spring identification labels and descriptive identification do not match for some locations.

Inconsistencies exist between the plan, the PHC, and information provided in an e-mail to Ken Wyatt for the Divisions Water Quality data base Electronic Data Input. Although the notation used for geologic structure in Table 1 of the Mayo report, are a geologic standard, the general public may not be familiar with the notation. Table 1 should include a legend, and the stiff diagrams stated to be specific to geologic structure should include that structure on the diagrams as well.

Table 2: Baseline Spring Sampling Wild Horse Ridge Mayo Report

Site/Location	No. Data Samples sampling period	Geology	Flow rate (gpm) Min/Max
WHR-2 Fish Creek LF-East	7 7/31/91 - 8/30/94	Tf-TKnh	0.2/20
WHR-3 Head Fish Creek	8 7/30/91 - 10/31/94	Tf	0.5/70
WHR-4/SBC-13/SBC-16 Fish Creek LF-West	8 7/30/91 - 10/31/94	Tf-TKnh	0/65
WHR-5/SBC-15 Bear Canyon RF (above coal outcrop)	8 7/31/91 - 10/30/94	Tf-TKnh	0.0/17
WHR-6/SBC-14 Bear Canyon RF (near disturbed area)	8 10/26/93 - 6/24/97	Kbh	0.5/15
WHR-7 Fish Creek LF- West	1 7/30/91	Kbh	40
WHR-8 Wild Horse Ridge	1 7/31/91	Kbh	5
16-7-24-3 Bear Canyon Cliff Face	1 3/17/99	Kbh	no flow reported- chemical analysis obtained
16-7-24-4/SBC-17 Bear Canyon Fault	1 3/17/99	Kbh	no flow reported- chemical analysis obtained

Tf- Flagstaff Formation

TF-TKnh- at the contact between the Flagstaff and North Horn Formation

Kbh-Black Hawk Formation

Table 2b: Baseline Spring Sampling Wild Horse Ridge

Site/Location	Date				Comments
	1st Q	2nd Q	3rd Q	4th Q	
WHR-2 1991 1992 1993 1994 1997			7/31/91	10/28/92	Left Fork Fish Creek east side dry 10/31/94
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/30/94	10/31/94	
		6/25/97	9/10/97	10/20/97	
WHR-3 1991 1992 1993 1994 1997			7/30/91	10/27/92	Head waters of Fish Creek Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/30/94	10/31/94	
		6/25/97	9/10/97	10/20/97	
WHR-4 1991 1992 1993 1994 1997			7/30/91	10/28/92	Left Fork Fish Creek west side. 03/93, 03/94 not accessible. Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C on 10/94.
	03/22/93	6/24/93	8/15/93	10/13/93	
	03/30/94	5/30/94	8/29/94	10/31/94	
		6/24/97	9/10/97		
WHR-5 1991 1992 1993 1994 1997			7/30/91	10/28/92	Right Fork - Left Fork Bear Canyon 03/93, 03/94 not accessible. Fluoride not distilled 10/92, 6/93, 8/93. Holding time expired on Ortho Phosphate 10/13/93. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 10/94.
		6/24/93	8/15/93	10/13/93	
		5/30/94	8/29/94	10/31/94	
		6/24/97	9/10/97	10/20/97	
WHR-6 1993 1994 1995 1997	3/23/94	6/01/94 5/24/95 6/24/97	8/28/94 8/22/95 09/18/97	10/26/93 10/26/94 10/28/97	Right Fork - Right Fork Bear Canyon 03/94 not accessible. Holding time expired on Sulfate 10/93. Possible matrix interference with Cl-6/94. Possible matrix interference with Nitrite- 10/94. Possible matrix interference with Selenium- 5/95. Dissolved metals filtered at lab received within a day. Sample > 6 deg C, on 8/95.

The Mayo Report discusses spring discharge rates by formation using a calculated R-value which is the sum of the minimum flows, over the sum of the maximum flows for all springs issuing from the formation. This analysis provides a generalized description for the formation while individual r-values for springs within the formation may vary from the generalized description. Data used for the springs do not have a continuous record; therefore, high and low flow data is not represented for each year within the period of record (1991 to 1999). The climate, from 1991 to 1999, consisted of the end of a 4 year long dry spell, moving into short periods of moderately to severely wet climate disrupted by intermittent dry periods (Region 4 and 5 drought index). Some data used in the analysis may be influenced by historic mining activities. Although the Mayo Report states that Figure 6a and 6b represent the maximum and minimum discharge rates from each formation, the data record is not continuous enough to support this statement. However, the general high and low flow pattern for these formations is probably representative.

Surface-water information

The Mayo Report identifies Trail Creek, Bear Creek, and Lower Cedar Creek as perennial. The upper Trail Creek, Mc Cadden Hollow, Blind Canyon, Left and Right Forks of Fish Creek and Upper Cedar Creek are intermittent or ephemeral.

Baseflow to Lower Trail Creek was attributed to be sustained by flow from springs in the area especially TS-1. Baseflow appears to be about 25 gpm for the period of record until mid 1995 where baseflow appears to increase. Baseflow to Bear Canyon Creek is estimated to be about 30 to 50 gpm and is attributed to be sustained from springs such as FBC-12, emerging from the North Horn Formation.

According to the PHC, there is not adequate data presented to date to determine whether Fish Creek is perennial or intermittent. During 1996 and 1997 low flow was 15 gpm in Fish Creek in both the Left and Right Forks. It is recommended the applicant monitor flow monthly at these sites for the following year at the Left Fork and Right Fork to determine their status as perennial or intermittent. It is suspected that these drainages may become intermittent during periods of prolonged drought.

Baseline cumulative impact area information

Adjacent area information is included within this permit application package for areas where future mining is likely to occur.

Table 3: Baseline Stream Sampling Wild Horse Ridge

Site/Location		Date				Site Flow Rates (gpm)	Comments
		1st Q	2 nd Q	3rd Q	4th Q		
CK-1 (not on Map)			06/94 06/95 07/96		10/94 10/95 10/96	Max 1104 Min 103 Average 666	Field data only. No sample date.
CK-2 (not on Map)			06/94 06/95 07/96		10/94 10/95 10/96	Max 950 Min 4 Average 241	Field data only. No sample date.
LF-1	1994 1995 1996		06/09/94	07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 266 Min 15 Average 68.5	
RF-1	1994 1995 1996		06/09/94	07/10/95 07/16/96	10/27/94 10/18/95 10/15/96	Max 191 Min 15 Average 66.5	
WHR-1	1991 1992 1993 1994 1997	03/29/93 03/23/94	06/24/93 06/01/94 06/29/97	07/31/91 08/15/93 08/29/94 09/17/97	10/28/92 10/26/93 10/30/94	Max 650 Min 0 Average 89.0	No access on 03/93. Dry 08/94. No flow recorded 10/28.

Modeling

Modeling is not proposed to be used instead of data acquisition.

Alternative water source information

No additional information on alternative water source information was presented in this amendment.

Probable hydrologic consequences determination

The probable hydrologic consequences determination is provided in Mayo and Associates, LC "Investigation of Groundwater and Surface - Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Ground Water Monitoring" August

1999. Pertinent portions from this determination will be used to update the CHIA and complete technical directive process at Birch Spring and Big Bear Spring.

Findings:

R645-301-121.200. 1) The statement made on pg 3-16 "Water generated is historically used within the mine with no discharge to surface waters" is no longer an accurate statement and should be re-stated or removed, 2) Lab sheets for all sites where data was collected in July 1991 need to be provided, 3) The notation for springs and drill logs labeled WHR- may be confused: unique labels should be used, 4) The notation used for geologic structure in Table 1 of the Mayo report should include a legend and the stiff diagrams for springs: geologic formation should also be noted on the spring hydrographs, 5) The references for some water monitoring sites needs clarification: water monitoring references differ between the Mayo report, the text in the plan, and information presented to Ken Wyatt by e-mail for input into the data base, 6) Wells MW-114, 116 and 117 should all be monitored prior to mining the Wild Horse Ridge to verify the existing water elevations recorded so the pre-mining status at these wells will not be in question. Water dating and stiff diagrams should also be conducted to verify the information found west of the Bear Canyon Fault can be applied to the Star Point Sandstone Formation west of the Bear Canyon fault, 7) According to the PHC, there is not adequate data presented to date to determine whether Fish Creek is perennial or intermittent. The applicant should monitor flow monthly, for the following year, at the Left Fork and Right Fork to determine the status as perennial or intermittent, and 8) Not all pages with text changes are dated relative to the date the change was submitted.

**MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE
INFORMATION**

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring Sampling Location Maps

Plate 7-4, entitled Water Monitoring, should be re-labeled as Baseline Water Map because it is referenced to contain baseline seep and spring information and water rights. This would minimize confusion between baseline information and proposed Operational Monitoring Stations. Springs WHR-7 and WHR-8 were not found on the map. Surface water monitoring location maps did not include sites CK-1 and CK-2.

Surface Water Resource Maps

Water rights do not appear to be updated on Plate 7-4. There are some stock watering ponds that have water rights according to information in the Utah Division of Water Rights Internet page, that are not on the map. The adjacent area for this map has expanded and the areal extent for this map should be adjusted.

Findings:

The application does not meet the minimum regulatory requirements for this section. The permit must be updated to meet the following:

R645-301-742. 1) Water rights should be updated on Plate 7-4. There are some stock watering ponds that have water rights according to information in the Utah Division of Water Rights Internet page, that are not on the map. The adjacent area for this map has expanded and the areal extent for this map should be adjusted, 2) Plate 7-4, entitled Water Monitoring, should add "Baseline" or otherwise minimize confusion between baseline information and proposed operational monitoring stations contained on Plate 7N-2, 3) WHR-7, WHR-8, CK-1, and CK-2 should be included on Plate 7-4.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143,

-300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514,
-301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731,
-301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring

The plan references a recommended water monitoring plan, included in Appendix 7-J, section 10.0. The proposed monitoring plan is contained in section 7.1.7.

One flow measurement was obtained at springs WHR-7 and WHR-8. No information was provided for WHR-9. The plan indicates that these springs will not be monitored because WHR-4 will represent these springs. The PHC indicates that subsidence occurs about 300 ft above the coal for 10 ft of coal removal. There was no discussion on multiple seam removal in the subsidence portion in the PHC. Site WHR-7 was estimated to be approximately 400 ft above the Tank Seam while WHR-9 and WHR-8 are close to drill logs showing no coal. Greater justification for excluding these springs from baseline and long term monitoring needs to be presented in the plan, or they should be included in the monitoring program.

The PHC indicates it is unknown whether water may be encountered along the Bear Canyon Fault from the east, but that this water is suspected to have antiquity. The well closest the fault, MW-117, should be monitored in conjunction with MW-114, as this well would most likely show effects if waters with antiquity do discharge to the fault should it be encountered during mining.

The statement made on pg 3-16 "Water generated is historically used within the mine with no discharge to surface waters" is no longer an accurate statement and should be re-stated or removed.

Surface-water monitoring

The Upper Right Fork Bear Creek, BC-4 above the proposed disturbed area will be added to the monitoring plan. Surface water monitoring at Fish Creek, WHR-1, and McCadden Hollow, MH-1, were added to the monitoring plan. WHR-1 was indicated to be monitored in Fish Creek, but was not in the list of surface water monitoring sites. The proposed monitoring schedule needs to be clearly presented.

Acid and toxic-forming materials

Information is contained in Appendix 6-C of the MRP. According to the PHC, strata in

the proposed permit area is expected to be identical to the existing permit area. Acid from pyrite oxidation is readily consumed by dissolution of carbonate minerals available in the mine area.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

It was estimated that 0.05 cfs water will be required for mining associated with the Wild Horse Ridge. A Water line from #1 mine to the #3 and #4 mine is located along the conveyor. This water is to be used for a bath-house, drinking water and for spray; on the working face, at coal belt heads, at transfer points and at the tippie for dust suppression.

Gravity discharges

No gravity discharges are proposed for the Wild Horse Ridge mines.

Water quality standards and effluent limitations

Water quality standards and effluent limitations must be conducted according to State Standards and the approved UPDES permit. A copy of the current permit, which includes a discharge point for Pond D is included in Appendix 7-B.

Diversions

Diversion designs are provided for the 10 year- 6 hour event. The applicant committed to maintain the minimum required cross sectional area. Freeboard was presented to be 0.10 ft (less than an inch), in some cases, to 0.48 ft. Standard engineering practices generally use a minimum of 0.3 ft (.28 is acceptable). Ditch capacities should meet the common minimum design standards. Along the roads, additional culverted cross drains may be advantageous in meeting the ditch requirements without requiring changes in the road surface slope.

Road Drainage

The applicant should consider placing a culvert at the approximate location of label D-21U. The primary no. 3 road retains this drainage along the in slope for a significant distance in this region. Also the slope breaks from a steep section to a low gradient area at this location which may result in maintenance problems.

Stream buffer zones

The Division will need to grant approval for construction in a buffer zone. This will be completed when all deficiencies for the proposed mine application are addressed. Currently a road, and road culvert exists where the proposed portal access road is located. Portions of the access road existing prior to mining will require minimal upgrading (Appendix 3O). The two conveyor access roads will be used to construct the Bear Creek Culvert Crossing along segment C, Upper Access Road, and will be conducted in accordance with the approved Stream Alteration Permit obtained from the State Division of Water Rights (Appendix 3O-pg 4). A copy of the permit is needed to complete the stream buffer zone section.

Sediment control measures

Construction - Sediment Control Methods

A berm will be created on the downslope side of a cut. Road cuts will be made into the slope rather than parallel to the slope. Blasts will be designed to drop material into the cut area behind the berm, pg. 3O-3. Along the Blind Canyon Seam Portal Pad temporary and permanent silt fences will be placed to treat all runoff from the disturbed area not contained by a berm. Fences will remain in place until all runoff is directed to the sedimentation pond and erosion control matting will be used on the out slope of the Blind Canyon Seam Portal pad fill, pg. 30-5.

Discussions related to culvert placement and pad and operational construction in the drainages are not detailed. The applicant does state that "Following initial pad and pad contouring the sediment pond will be constructed followed by road crowning and ditch and culvert placement, pg. 3O-6; however, this does not illustrate water and drainage is being routed to the sedimentation during the first feasible opportunity, additional detail is needed.

Operational - Sediment Control Methods

Sediment control measures include using a sedimentation pond and BTCA erosion control areas "V" and "W". The BTCA area "V" includes the out slope along the conveyor access road and the Blind Canyon portal pad out slope area. These areas are mapped on Plate 7-1G. Erosion control matting will be used on the out slope and a berm will be placed on the outside edge to prevent water from flowing onto the slopes.

The BTCA areas "W" include the conveyor belt areas. A silt fence will be placed down slope during construction and be evaluated for removal following construction. During operations, coal fines will be captured in a metal pan below the belt and will be cleaned off the pan. In area one, the pan will be cleaned with water draining to a disturbed area ditch D-3D while area two will report to a catch basin. The Wild Horse Ridge Coal Storage Bin area will also

include a catch basin. A dust cover will be placed over the map to prevent fine coal wind transport. These areas are mapped on Plates 7-1C, 7-1F and 7-1G. The designs, calculations and certification for these basins are provided in Appendix 7-K. Capacity was based on a 10 year 6hr storm peak. Catch basins will be inspected and cleaned as necessary to maintain capacity. The catch basins need an outlet, so flow from the basin is controlled under situations that exceed the storage volume.

Siltation structures

See: Sedimentation Ponds.

Sedimentation ponds

The sedimentation ponds must maintain adequate sediment storage capacity. The proposed clean out level "before 100 % of the clean out level has accumulated" does not meet this requirement and should be removed from the plan, or otherwise re-worded.

The proposed Wild Horse Ridge area includes designs for sedimentation pond 'D'. All runoff from the portal pad area will report to this pond. At pond 'D, the decant structure is located above the 60% clean out level. The clean out elevation is 0.55 ft below the decant elevation.

A single open channel spillway is proposed for discharge from the pond. No controls for an oil skimmer are provided for the sedimentation pond should the runoff exceed the 10 year - 24 hour event. A Fuel Tank is located on the pad draining to this pond; however, no volume or discussion on the containment structure was found. Since the runoff from this pond eventually makes it's way to Huntington Creek and fuel is used in this location, this does not provide adequate protection for fish and wildlife. The 1997 SPCC plan is not provided; a determination can not be made as to whether the proposed plan minimizes potential for hydrocarbons to be released off the permit area.

Dames and Moore conducted a stability analysis for the Portal Staging Area sedimentation pond, July 23, 1999. This analysis for steady state seepage assumes a 7 foot deep pond is full and two seepage conditions exist: 1) A straight line condition through the fill, and 2) Seepage controlled by the native sandstone and colluvium interface. Results suggest during a pseudo-static loading condition, shallow surface slide and sloughing from the structural fill and native slopes could be expected with strong ground movement. Proposed embankments have a minimum safety factor of 1.46.

Other treatment facilities

No "other treatment facilities" are proposed.

Exemptions for siltation structures

No exemption from siltation structures is proposed.

Discharge structures

Discharge structures are designed to minimize erosion.

Impoundments

See: Sedimentation Ponds.

Casing and sealing of wells

No changes to the casing and sealing of wells is proposed. The existing plan is assumed to be adequate to handle this regulatory requirement.

Findings:

R645-301-742.221.36. The sediment pond must maintain adequate sediment storage capacity. The section in text proposing the clean out level occurs "before 100 % of the clean out level has accumulated" should be removed from the plan, or otherwise be re-worded.

R645-301-512.240. Current prudent engineering practices need to be followed: 1) Controls for an oil skimmer should be provided for the single open channel spillway on sedimentation pond 'D'(run off exceeding the 10 year - 24 hour event would allow oil contained in the pond to discharge out the spillway), 2) Catch basins need an outlet, so flow from the basin is controlled under situations that may exceed the storage volume.

R645-301-742.314. Standard engineering practices generally use a minium of 0.3 ft. Ditch capacities should meet common minium design standards. Along the roads additional culvert cross drains may be advantageous in meeting the ditch requirements without requiring changes in the road surface slope.

R645-301-730. 1) Site WHR-7 , WHR-8 and WHR-9 require further site specific description to justify excluding these springs from baseline and long term monitoring needs, or include them in the monitoring program. A discussion on multiple seam removal should be included in the subsidence portion in the PHC, 2) MW-117, should be monitored in conjunction with MW-114 (this well would most likely show effects, if fault water is encountered during mining, and this well discharges to the fault), and 3) Surface water monitoring at Fish Creek, WHR-1, was added to the monitoring plan, WHR-1 was indicated to be monitored in Fish Creek in some locations in the plan, but the information was not clearly presented in the text or tables under section 7-53, 4) Construction sequence information for roads and pad areas constructed in drainages needs to be provided.

R645-301-728. The 1997 SPCC plan is not provided; a determination can not be made as to whether the proposed operation plan minimizes potential for hydrocarbon impacts.

R645-301-The Approved Stream Alteration Permit obtained with the State Division of Water Rights for the proposed stream channel alteration was referenced but was not found in the plan. This information is necessary to make buffer zone findings.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26;
R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Terracing is provided as a method for reclamation as described on page 3-75. The areas proposed to be terraced should be provided on the reclamation map. Although terracing may be appropriate in some locations it is found to be less effective than simple slope changes in many locations in Utah. Slope form or slope brakes that decrease the gradient and retain the overland flow are best technology available for erosion control. In steep sections slope faces steepened at the top and concave toward the base integrated with low angle slopes are known to be successful.

Portals will be sealed with backfill beginning at the Blind Canyon portal and backfilling the cut slope as it is excavated from down slope side. A narrow access road will be retained for topsoil access. Topsoil will be placed on excavated areas and then the access road will be reclaimed (3-117 to 3-118). Since there will be a Blind Canyon portal east and west of Bear Creek the plan needs to be more descriptive at to the area referenced in this case.

The plan states "since a cut slope existed along portions of this area prior to mining there may not be enough material to completely eliminate the entire cut" (pg. 3-118). Detailed maps identifying the extent and longitudinal form proposed for backfilling these areas should be provided. If complete backfill is not demonstrated to be available, other land-form methods can be used to provide reshaping to complement the drainage pattern of the surrounding terrain.

Findings:

R645-301-730. More information needs to be provided showing the location and proposed extent of terracing on the reclamation maps and in areas where the cut slope may not be completely eliminated. Clarification for reclamation activities applied at locations east and west of the Bear Canyon Creek need to be made.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring

No additional specifics are provided regarding ground-water monitoring for the Wild Horse Ridge. The operational monitoring plan is assumed to continue through bond release.

Surface-water monitoring

No additional specifics are provided regarding surface-water monitoring for the Wild Horse Ridge. The operational monitoring plan is assumed to continue through bond release.

Acid and toxic-forming materials

See the operations section of this TA.

Transfer of wells

No discussion on transfer of wells in the new permit area is provided. It is assumed all wells will be properly abandoned when no longer needed for mining.

Discharges into an underground mine

No discharges into an underground mine are proposed for reclamation purposes.

Gravity discharges

No discussion indicating gravity discharges is expected in relation to the Wild Horse Ridge reclamation.

Water quality standards and effluent limitations

No specific information is presented indicating how water quality standards and effluent limitations will be determined prior to bond release.

Diversions

Roads to be retained in place will be re-graded to the proposed post-mining configuration and fitted with diversions. A typical cross section is in 3.6.4, pg. 3-60. To maintain the road as a post-mining land use, 11 culverts will be retained. Construction of the Wild Horse Ridge Access Road (proposed for retention for post-mining land use) and conveyor Access roads No.1(lower

road) and No.2 (upper road) are described in App.3-O and will be reclaimed the same as described in section 3.6.11 and 3.6.12 (3D-7A). Stream channel reclamation uses a ripped channel design as presented in Appendix 7H.

Stream buffer zones

No findings on buffer zone disruption during reclamation procedures will be made by the Division until all other outstanding issues are resolved.

Sediment control measures

All re-graded and top soiled areas will be mulched or otherwise treated to retain moisture and control sediment page 4-13. Related surfaces will be ripped and scarified using a trackhoe, and include roughening to 8-12 inch deep pockets. See sedimentation ponds.

Siltation structures

See sedimentation ponds.

Sedimentation ponds

Sediment pond 'D' is proposed to be removed during reclamation of the portal pad as described in Appendix 7-K. This amendment needs to provide a reclamation construction sequence describing the methods used during pad area reclamation to minimize sediment contributions to the drainage. Discussions should include sequences in the culvert removal, fill removal and placement in conjunction with the grading and proposed erosion control measures.

Other treatment facilities

No other treatment facilities are proposed in conjunction with the Wild Horse Ridge amendment.

Exemptions for siltation structures

No exemptions for siltation structures are requested in association with the Wild Horse Ridge amendment.

Discharge structures

No Discharge structures are proposed for retention in association with the Wild Horse Ridge amendment.

Impoundments

See sedimentation ponds.

Casing and sealing of wells

No changes are made to the existing plan in conjunction with casing and sealing of wells. It is assumed the existing plan adequately addresses this requirement.

Findings:

R645-301-731. Sedimentation pond 'D' is proposed to be removed during reclamation of the portal pad as described in Appendix 7-K. This appendix needs to provide a reclamation construction sequence for the methods used during pad area reclamation to minimize sediment contributions to the drainage. Discussions should include sequences in the culvert and fill removal, fill placement, along with the grading and proposed erosion control measures.

RECOMMENDATIONS:

The deficiencies discussed in this memorandum should be addressed prior to permit approval.